

# MULTIPHASE CENTRIFUGAL COMPRESSOR

## Abstract

A multi-phase centrifugal supercharging system (10) constructed in accordance with the principles of a preferred embodiment of the present invention and configured for supplying compressed induction fluid to an engine (E) is disclosed. The illustrated air induction system (10) broadly includes a drive assembly (12) powered by the engine (E), a supercharging assembly (14) driven by the drive assembly (12) to compress induction fluid, and an induction fluid flow control assembly (16) in communication with the supercharging assembly (14) to control operation of the supercharging assembly (14) and cooperating therewith to deliver the compressed induction fluid to the intake manifold (IM) of the engine (E). The supercharging assembly (14) includes a pair of centrifugal superchargers (28 and 30). The drive assembly (12) is a simple direct belt drive that continuously operates the superchargers (28,30) at a constant ratio relative to the rotation of the crankshaft (C). The flow control assembly (16) phases the superchargers (28,30) between multiple operating phases, including a series phase (172) and a parallel phase (176), to supply constant target boost to the intake (IM) over the entire rev range of the engine (E). An alternative air system (306) is also disclosed, in use with a pneumatic conveyor (300), that phases between normal series operation and parallel, clog-displacing operation.